IN THE CLAIMS

Please amend the presently pending claims as follows:

1. (Currently Amended) ~~Method~~ A method for the decoding of a received signal comprising symbols distributed in space, time and/or frequency by ~~means of~~ a space-time or space-frequency encoding matrix, ~~characterized in that~~wherein the method implements a space-time decoding step and at least one iteration, each iteration comprising the following sub-steps:

[[-]] diversity pre-decoding, which is the inverse of a diversity pre-encoding carried out when said signal is emitted, delivering pre-decoded data;

[[-]] estimation of the symbols forming said signal, from said pre-decoded data, delivering estimated symbols; and

[[-]] diversity pre-encoding identical to said diversity pre-encoding implemented at emission, applied to said estimated symbols, to give an estimated signal, except for the last iteration.

2. (Currently Amended) ~~Decoding~~The method according to claim 1~~, characterized in that it comprises the following steps~~ comprising:

[[-]] the space-time decoding, which is the inverse of the space-time encoding implemented at emission, delivering a decoded signal;

[[-]] equalization of said decoded signal, delivering an equalized signal;

[[-]] conversion of ~~the~~a matrix of the equalized signals into a diagonal matrix, obtained from a total encoding/channel/decoding matrix taking account of at least said encoding matrix, and of a decoding matrix~~, corresponding to the matrix~~ that is the conjugate transpose of said encoding matrix;

[[-]] the diversity pre-decoding, which is the inverse of ~~a~~

the diversity pre-encoding implemented at emission of said signal, delivering the pre-decoded data;

[[-]] the estimation of the symbols forming said signal, from said pre-decoded data, delivering the estimated symbols;

[[-]] the diversity pre-encoding, identical to said diversity pre-encoding implemented at emission, applied to said estimated symbols, to give ~~an~~the estimated signal; and

[[-]] at least one iteration of an interference cancellation step implementing the following sub-steps:

[[-]] subtraction, from said equalized signal, of said estimated signal multiplied by an interference matrix, delivering an optimized signal ;

[[-]] diversity pre-decoding of said optimized signal, that is the inverse of ~~a~~ the diversity pre-encoding implemented at emission of said signal, delivering improved pre-decoded data;

[[-]] estimation of the symbols forming said optimized signal, from the improved pre-decoded data, delivering new estimated symbols; and

[[-]] diversity pre-encoding identical to said diversity pre-encoding implemented at emission, applied to said new estimated symbols to give a new estimated signal, except for the last iteration.

3. (Currently Amended) ~~A~~The method according to claim 2, ~~characterised in that~~wherein said space-time decoding and equalization steps and/or said equalization and conversion steps are done jointly.

4. (Currently Amended) ~~A decoding~~The method according to ~~any of the claims 1 to 3, characterized in that~~ claim 1, wherein said encoded symbols ~~being~~are emitted by means of at least two antennas, which produce ~~the~~ different corresponding transmission

channels and wherein the method of decoding ~~are taken~~ takes the different corresponding transmission channels comprehensively into account.

5. (Currently Amended) ~~Decoding~~ The method according to ~~any of the claims 2 to 4, characterized in that~~ claim 2, wherein said equalization step implements an equalization according to one of the techniques belonging to the group comprising:

- MMSE type equalization;
- EGC type equalization;
- ZF type equalization; and
- equalization taking account of a piece of information representing ~~the~~ a signal-to-noise ratio between the received signal and ~~the~~ a reception noise.

6. (Currently Amended) ~~Decoding~~ The method according to ~~any of the claims 2 to 5, characterized in that~~ claim 2, wherein said steps of symbol estimation implement a soft decision, associating a piece of confidence information with ~~a~~ the soft decision and ~~in that~~ said subtraction step or steps take account of said pieces of confidence information.

7. (Currently Amended) ~~Decoding~~ The method according to ~~any of the claims 2 to 5, characterized in that~~ claim 2, wherein said received signal ~~is~~ comprises a multicarrier signal.

8. (Currently Amended) ~~A decoding~~ The method according to ~~any of the claims 1 to 7, characterized in that~~ claim 1, wherein said pre-encoding is obtained by one of the following methods:

[[-]] a spread-spectrum ~~techniques~~ technique; and

[[-]] linear pre-encoding.

9. (Currently Amended) ~~A decoding~~ The method according to ~~any of the claims 1 to 8, characterized in that it~~ claim 1, wherein the method implements an automatic gain control step before or after said equalization step and/or during at least one of said

iterations.

10. (Currently Amended) ~~A decoding~~The method according to ~~any of the claims 1 to 9, characterized in that it comprises~~ claim 1 and further comprising a channel-decoding step, symmetrical with a channel-encoding step implemented at emission.

11. (Currently Amended) ~~A decoding~~The method according to claim 10, ~~characterized in that~~ wherein said channel-decoding step implements a turbo-decoding operation.

12. (Currently Amended) ~~A decoding~~The method according to ~~any of the claims 1 to 11, characterized in that it comprises~~ claim 1 and further comprising at least one de-interlacing step and at least one re-interlacing step, corresponding to an interlacing implemented at emission.

13. (Currently Amended) ~~A decoding~~The method according to ~~any of the claims 1 to 12, characterized in that it comprises comprise~~ claim 1 and further comprising a step of improvement of a channel estimation, taking account of the ~~data estimated~~ estimated symbols during at least one of said iterations.

14. (Currently Amended) ~~A decoding~~The method according to ~~any of the claims 1 to 9, characterized in that, said received signal being transmitted~~ claim 2 and further comprising transmitting by ~~means of~~ four antennas the signal to be received, referred to as the received signal, through at least one transmission channel, wherein said total encoding/channel/decoding matrix is equal to:

$$G=\gamma\begin{bmatrix} A & 0 & 0 & J \\ 0 & A & -J & 0 \\ 0 & -J & A & 0 \\ J & 0 & 0 & A \end{bmatrix}$$

with :

$$A=|h_1|^2+|h_2|^2+|h_3|^2+|h_4|^2$$

$J = 2\mathrm{Re}\{h_1 h_4^* - h_2 h_3^*\}$, representing the interference, and

$$\gamma = \frac{1}{|h_1|^2 + |h_2|^2 + |h_3|^2 + |h_4|^2 + \frac{1}{SNR}}$$

where: $H = \begin{bmatrix} h_1 & h_2 & h_3 & h_4 \\ -h_2^* & h_1^* & -h_4^* & h_3^* \\ -h_3^* & -h_4^* & h_1^* & h_2^* \\ h_4 & -h_3 & -h_2 & h_1 \end{bmatrix}$ is a matrix grouping the space-time encoding and the transmission channel, and SNR represents the signal-to-noise ratio.

15. (Currently Amended) ~~A decoding~~The method according to ~~any of the claims 1 to 14, characterized in that, said received signal being transmitted~~claim 2 and further comprising transmitting by ~~means of~~ eight antennas the signal to be received, referred to as the received signal, through at least one transmission channel , wherein said total encoding/channel/decoding matrix is equal to:

$$G = \gamma \cdot H^H \cdot H = \gamma \begin{bmatrix} A & 0 & 0 & 0 & J & 0 & 0 & 0 \\ 0 & A & 0 & 0 & 0 & J & 0 & 0 \\ 0 & 0 & A & 0 & 0 & 0 & J & 0 \\ 0 & 0 & 0 & A & 0 & 0 & 0 & J \\ J & 0 & 0 & 0 & A & 0 & 0 & 0 \\ 0 & J & 0 & 0 & 0 & A & 0 & 0 \\ 0 & 0 & J & 0 & 0 & 0 & A & 0 \\ 0 & 0 & 0 & J & 0 & 0 & 0 & A \end{bmatrix}$$

with $A = |h_1|^2 + |h_2|^2 + |h_3|^2 + |h_4|^2 + |h_5|^2 + |h_6|^2 + |h_7|^2 + |h_8|^2$ and

$J = 2\mathrm{Im}\{h_1 h_5^* + h_2 h_6^* + h_3 h_7^* + h_4 h_8^*\}$

and $\gamma = \frac{1}{|h_1|^2 + |h_2|^2 + |h_3|^2 + |h_4|^2 + |h_5|^2 + |h_6|^2 + |h_7|^2 + |h_8|^2 + \frac{1}{SNR}}$

where : $H = \begin{bmatrix} h_1 & h_2 & h_3 & h_4 & h_5 & h_6 & h_7 & h_8 \\ h_2 & -h_1 & h_4 & -h_3 & h_6 & -h_5 & h_8 & -h_7 \\ h_3 & -h_4 & -h_1 & h_2 & h_7 & -h_8 & -h_5 & h_6 \\ h_4 & h_3 & -h_2 & -h_1 & h_8 & h_7 & -h_6 & -h_5 \\ h_1^* & h_2^* & h_3^* & h_4^* & h_5^* & h_6^* & h_7^* & h_8^* \\ h_2^* & -h_1^* & h_4^* & -h_3^* & h_6^* & -h_5^* & h_8^* & -h_7^* \\ h_3^* & -h_4^* & -h_1^* & h_2^* & h_7^* & -h_8^* & -h_5^* & h_6^* \\ h_4^* & h_3^* & -h_2^* & -h_1^* & h_8^* & h_7^* & -h_6^* & -h_5^* \\ h_5 & h_6 & h_7 & h_8 & h_1 & h_2 & h_3 & h_4 \\ h_6 & -h_5 & h_8 & -h_7 & h_2 & -h_1 & h_4 & -h_3 \\ h_7 & -h_8 & -h_5 & h_6 & h_3 & -h_4 & -h_1 & h_2 \\ h_8 & h_7 & -h_6 & -h_5 & h_4 & h_3 & -h_2 & -h_1 \\ h_5^* & h_6^* & h_7^* & h_8^* & h_1^* & h_2^* & h_3^* & h_4^* \\ h_6^* & -h_5^* & h_8^* & -h_7^* & h_2^* & -h_1^* & h_4^* & -h_3^* \\ h_7^* & -h_8^* & -h_5^* & h_6^* & h_3^* & -h_4^* & -h_1^* & h_2^* \\ h_8^* & h_7^* & -h_6^* & -h_5^* & h_4^* & h_3^* & -h_2^* & -h_1^* \end{bmatrix}$

is a matrix grouping the space-time encoding and the transmission channel

and SNR represents the signal-to-noise ratio.

16. (Currently Amended) The method of claim 14 and further comprising, prior to the step of transmitting, ~~Encoding and decoding method, characterized in that~~ encoding said signal to be received, wherein the encoding implements a space-time encoding such that:

$$H=\begin{vmatrix} h_1 & h_2 & h_3 & h_4 & h_5 & h_6 & h_7 & h_8 \\ h_2 & -h_1 & h_4 & -h_3 & h_6 & -h_5 & h_8 & -h_7 \\ h_3 & -h_4 & -h_1 & h_2 & h_7 & -h_8 & -h_5 & h_6 \\ h_4 & h_3 & -h_2 & -h_1 & h_8 & h_7 & -h_6 & -h_5 \\ h_1^* & h_2^* & h_3^* & h_4^* & h_5^* & h_6^* & h_7^* & h_8^* \\ h_2^* & -h_1^* & h_4^* & -h_3^* & h_6^* & -h_5^* & h_8^* & -h_7^* \\ h_3^* & -h_4^* & -h_1^* & h_2^* & h_7^* & -h_8^* & -h_5^* & h_6^* \\ h_4^* & h_3^* & -h_2^* & -h_1^* & h_8^* & h_7^* & -h_6^* & -h_5^* \\ h_5 & h_6 & h_7 & h_8 & h_1 & h_2 & h_3 & h_4 \\ h_6 & -h_5 & h_8 & -h_7 & h_2 & -h_1 & h_4 & -h_3 \\ h_7 & -h_8 & -h_5 & h_6 & h_3 & -h_4 & -h_1 & h_2 \\ h_8 & h_7 & -h_6 & -h_5 & h_4 & h_3 & -h_2 & -h_1 \\ h_5^* & h_6^* & h_7^* & h_8^* & h_1^* & h_2^* & h_3^* & h_4^* \\ h_6^* & -h_5^* & h_8^* & -h_7^* & h_2^* & -h_1^* & h_4^* & -h_3^* \\ h_7^* & -h_8^* & -h_5^* & h_6^* & h_3^* & -h_4^* & -h_1^* & h_2^* \\ h_8^* & h_7^* & -h_6^* & -h_5^* & h_4^* & h_3^* & -h_2^* & -h_1^* \end{vmatrix}$$

~~and in that the decoding is a decoding according to claim 14~~.

17. (Currently Amended) ~~Receiver implementing means for decoding~~ A receiver for receiving a received signal, comprising symbols distributed in space and time and/or frequency by means of a space-time encoding matrix, ~~characterized in that it comprises~~ wherein the receiver comprises means of space-time decoding that is the inverse of the space-time encoding implemented at emission, and:

[[-]] means of diversity pre-decoding ~~of said optimized signal~~, performing a pre-decoding which is the inverse of a diversity pre-encoding carried out at emission of said signal, delivering pre-decoded data;

[[-]] means of estimation of the symbols forming said ~~optimized~~ signal, from the pre-decoded data, delivering new estimated symbols;

[[-]] means of diversity pre-encoding, performing a pre-encoding identical to said diversity pre-encoding implemented at emission, applied to said new estimated symbols, to give a new estimated signal,

said means of diversity pre-decoding, estimation, and diversity pre-encoding being implemented at least once for each symbol.

18. (Currently Amended) ~~Method~~ A method for the decoding of a received signal comprising symbols distributed in space, time and/or frequency by means of a space-time or space-frequency encoding matrix, ~~characterized in that~~wherein the method comprises ~~the following steps~~:

- diagonalization, obtained from a total encoding/channel/decoding matrix taking account of at least said encoding matrix, of a decoding matrix, corresponding to the matrix that is the conjugate transpose of said encoding matrix;
- demodulation, symmetrical with a modulation implemented at emission;
- de-interlacing symmetrical with an interlacing implemented at emission;
- channel decoding symmetrical with a channel encoding implemented at emission;
- re-interlacing, identical with the ~~one~~interlacing implemented at emission;
- re-modulation identical with the ~~one~~modulation implemented at emission, delivering an estimated signal; and
- at least one iteration of an interference cancellation step comprising a subtraction from an equalized signal of said estimated signal multiplied by an interference matrix, delivering an optimized signal.